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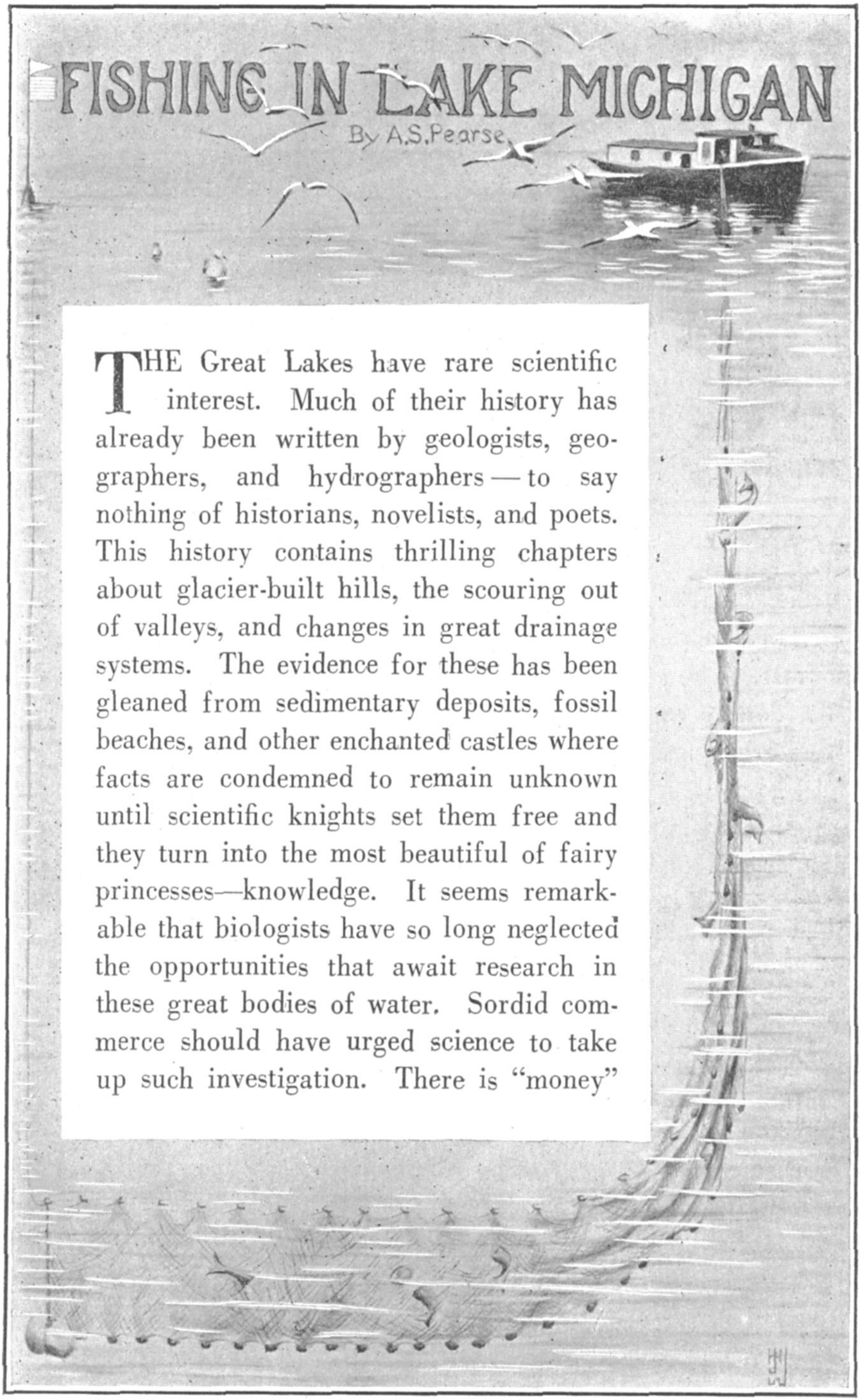
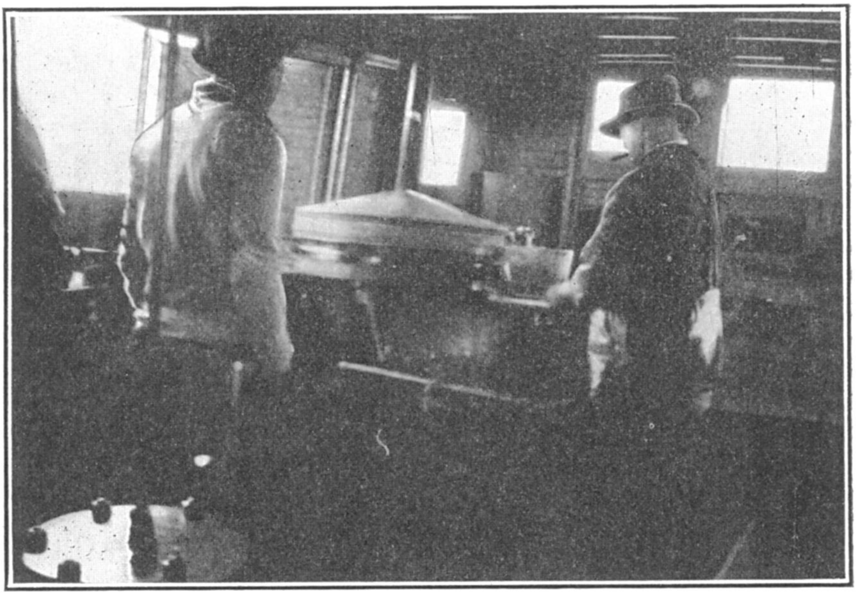


FISHING IN LAKE MICHIGAN

By A. S. Pearse

THE Great Lakes have rare scientific interest. Much of their history has already been written by geologists, geographers, and hydrographers — to say nothing of historians, novelists, and poets. This history contains thrilling chapters about glacier-built hills, the scouring out of valleys, and changes in great drainage systems. The evidence for these has been gleaned from sedimentary deposits, fossil beaches, and other enchanted castles where facts are condemned to remain unknown until scientific knights set them free and they turn into the most beautiful of fairy princesses—knowledge. It seems remarkable that biologists have so long neglected the opportunities that await research in these great bodies of water. Sordid commerce should have urged science to take up such investigation. There is "money"



THE MACHINE FOR HAULING NETS

in the Great Lakes, and commerce must always depend on science for the exploration, conservation and improvement of its resources. The fisheries of the Great Lakes bring in more than ten million dollars each year and the chief contributors are Lake Erie and Lake Michigan.[1]

The men who fish in the Great Lakes have the picturesqueness which is characteristic of deep water fishermen the world over. The danger and uncertainty of "open water" fishing give it the touch of romance that attracts bold spirits who like to take chances. The life is hard, but it may, and usually does, give rich rewards to those who follow it with industry, courage, and common sense. Fishermen are often "rough on the outside", but their life and training make them honest, independent and usually more thoughtfully courteous than those who have acquired "polish" in drawing rooms. One who has fished for a livelihood seldom goes back to the humdrum of a safe life on land. To give some idea of what a fisherman does each day on Lake Michigan the following description of a trip that the writer took as a guest on board the "Albert C. Kalmbach" is given:

On July 26 I got up at half past four and made my way through the deserted streets of Sturgeon Bay to the dock. A brisk wind was blowing in from Green Bay and the sky was overcast. Frank Higgins and his partner, Bill, were alrady loading boxes on board the "Albert C." when I arrived. "Boxes" are really trays and each holds about 1,600 lineal feet of gill net. This morning the "boys" were loading "small mesh" nets, for they were going out after chubs and bloaters in the deepest part of Lake Michigan. As they worked I looked over the boat. The "Albert C." had been in the water less than two months and was a fine example of the type of boat now in growing favor with lake fishermen. Years ago fishing tugs were in common use. But tugs are expensive to maintain and, as fishermen to man them grow harder to find, they are gradually being superceded by little gasoline boats. The "Albert C." measured forty-five feet in length and had twelve feet of beam. In the center of her cabin was a shining new two-cylinder Kahlenberg engine which cost $2,500 and would delight the heart of any fisherman—a heavy duty engine; not speedy, but to be relied upon in a storm. Except for the little platform forward for the man at the wheel, the remainder of the cabin was devoted to fishing tackle. Oilskins and coiled lines hung on the walls and boxes of nets were piled on the floor aft. A gasoline hoist for hauling the nets occupied the space on the left side of the cabin forward.

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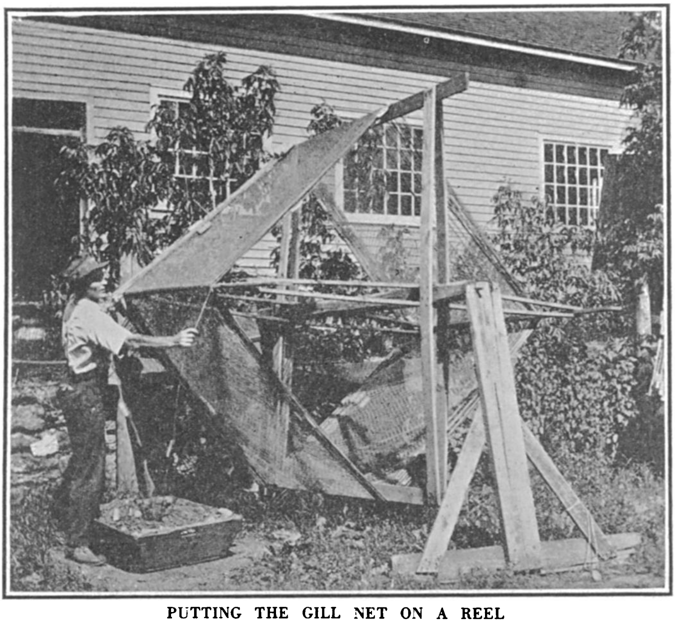
[1] According to the latest Report of the United States Bureau of Fisheries the value of the fisheries in these two lakes for the year 1917 was $4,332,767 and $4,038,927 respectively.

As soon as the boxes were stowed Bill lighted the torches at the tops of the cylinders. When "she" was hot he "turned her over" and we started. We backed out of the slip just after five o'clock, went under the bridge, and set our course toward the head of Sturgeon Bay. A dirty fishing-boat named "White Swan" tried to race us, but Bill "let her out a notch" and we soon left the upstart behind.

"Ain't that an engine?" said Bill.

At a quarter of six we passed the lighthouse and were on Lake Michigan. A noisy flock of herring gulls greeted us. These birds fol-

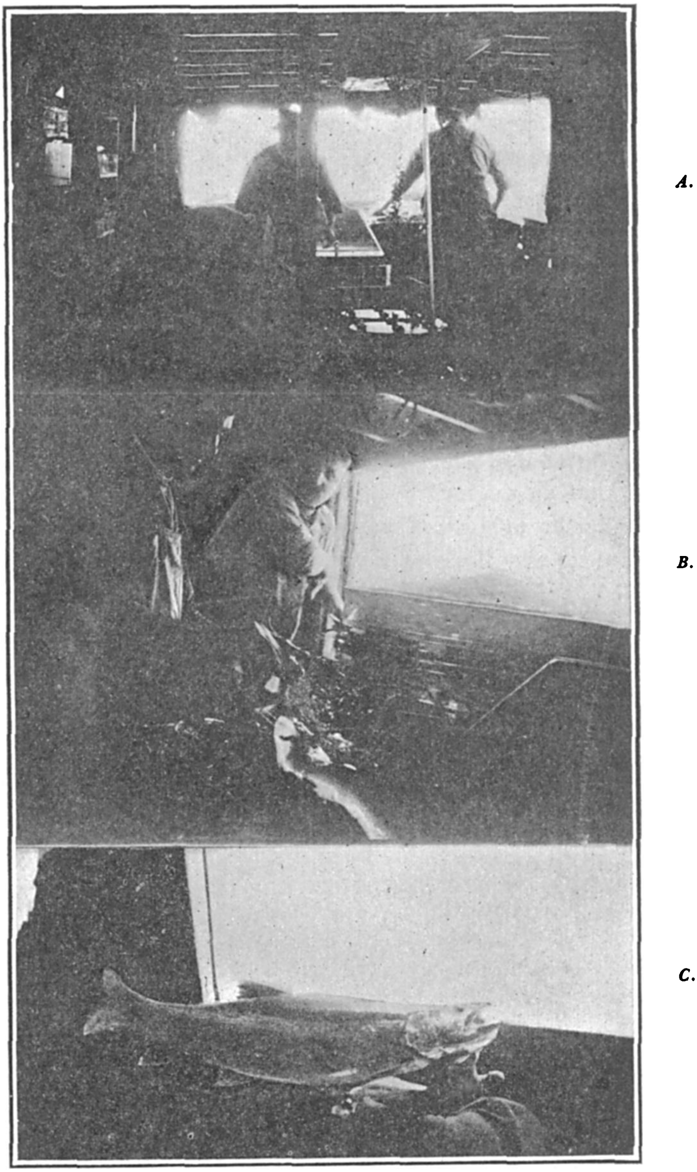


PUTTING THE GILL NET ON A REEL

lowed the boat all day, continually on the alert for fish or scraps. For nearly two hours Frank ran "NNE". It began to rain, the wind freshened and stirred up the lake. Toward ten o'clock, when we were about twelve miles offshore, Frank sang out:

"There's one'."

I peered in the direction he indicated but could see nothing. As we came close, however, I made out a couple of tattered squares of canvas waving from a pole which projected from the top of a wooden



A—SETTING NETS OFF THE STEM OF THE BOAT
B—A TROUT JUST OUT OF THE WATER
C—A LAKE TROUT

buoy. The boys put on their oilskins. As the buoy came alongside Frank tried to haul it in, but the waves were too much for him, and he missed it. We circled around and, approaching from a little better angle, the buoy came on board. Bill quickly started the hoist, and Frank threw the line that had been fastened to the buoy over it. The way the little fingers on the hoisting wheel handle lines and nets is almost uncanny. The wheel is horizontal and as it revolves the fingers around its margin take hold on one side and let go on the other. When a line is placed over the wheel it is grasped and pulled across from one side to the other. In this way the line came into the cabin and brought up a "string" of nets from the bottom.

The nets that we pulled had been set for seven days at depths of sixty-five to eighty fathoms. All of them were tied together in "strings" of four boxes each. A line leading up to a flag buoy was attached at each end of a string. Gill nets stand up from the bottom like a tennis net; weighted along the lower side with leads and stretched by the pull of corks along the upper side. Fishes swim into the meshes while moving along near the bottom and become entangled. Most of those brought up in the nets are still alive. The deeper waters of lakes are usually cold and fishes may live for a long time after being caught.

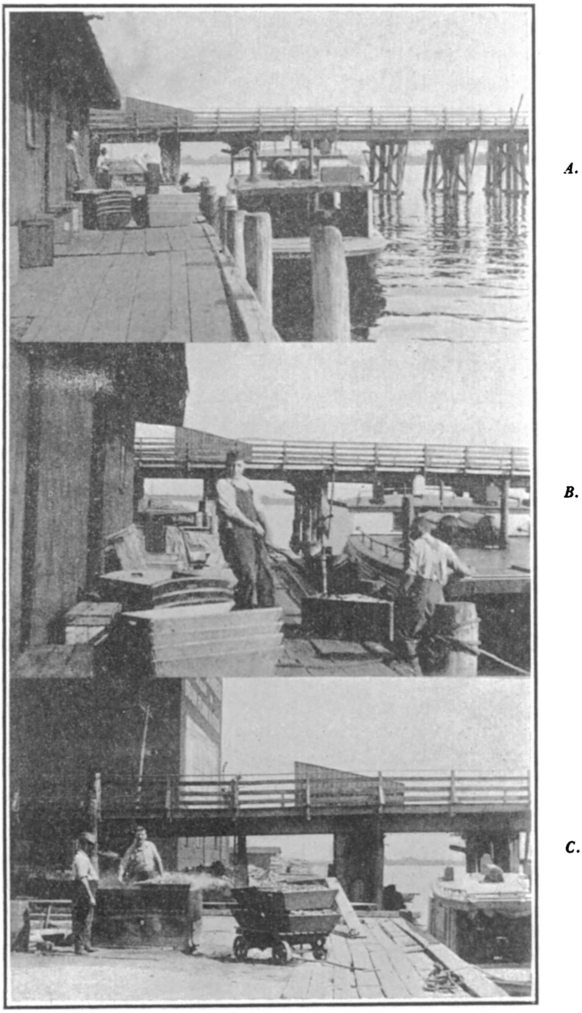
Bill stood by the port where the lines and nets came in and kept them running smoothly around the hoisting wheel. Frank dextrously took the fishes from the net, using a short awl in order to save his fingers from pricks and cuts. He also extracted cinders and twigs from the net before coiling it down in the box in front of him.

By half past twelve twenty boxes had been hauled and nets from the same number reset off the stern of the boat. The catch consisted of about 500 lake trout, 200 bloaters, 150 chubs, 12 lawyers, 2 blackfins, and 5 ugly little cottids, which the fishermen call "stonerollers". The lawyers, stonerollers, and a few of the other fishes were thrown back into the lake—to the great delight of the gulls.

I ate my lunch at eleven o'clock, but Frank and Bill did not get theirs until all the nets were set. On the way home Bill ran the boat, while Frank cleaned the catch. Frank performed his work with remarkable speed. Catching up a fish by its head, he laid it on a board; one movement with the knife removed the gills, another slashed open the ventral wall of the body, and a third threw out the visceral organs. At 3:10 P. M. we were back at the dock with the catch of the day cleaned and the cabin floor scrubbed.

I was glad to go on shore and rest, having lost my lunch in the lake, but the crew still had two or three hours work ahead. The nets had to be boiled, to keep them from rotting, and then spread on reels to dry. After that the nets to be set on the following day were to be wound off the reels into boxes. While the boat crew were looking after the nets, the men in the fish market sorted the fish and put them on ice.

Kalmbach's fish market, in Sturgeon Bay, is an interesting place. It is well equipped to care for all sorts of lake fishes and does both wholesale and retail business. The owner operates three boats which fish on a co-operative basis, the owner furnishing nets and boats and the crew getting a certain percentage of the catch. At the market fishes from pound nets are bought, mostly sheepshead and perch, and line fishermen bring in a number of pickerel each day. The retail departments sells fish to all who will buy—tattered urchins, pretty girls, hotel managers, dames in silken gowns come for fresh fish. Behind the market are three modern smoke houses where delectable chubs are prepared.



A—FISHING BOAT AT THE LOCK
B—UNLOADING BOXES OF LAKE FISH
C—BOILING NETS TO KEEP THEM FROM ROTTING

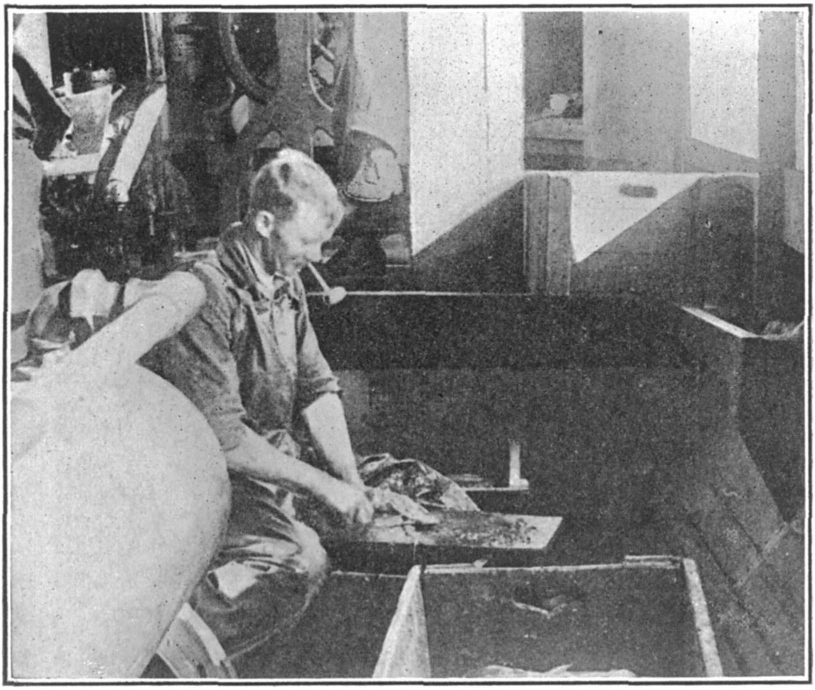
According to the Report of the United States Commissioner of Fisheries for 1918 the value of the equipment used for fishing in Lake Michigan in 1917 amounted to $4,038,927. This amount includes boats, nets, traps, lines, shore property, and the cash capital necessary for operation. The returns from the fisheries amounted to $2,270,859—a very fair amount for the capital invested. The fishes furnishing this revenue were as follows:

Fish.	Pounds	Value.
Trout, fresh	8,679,845	$856,228.00
Trout, salted	12,820	259.00
Ciscoes (chubs, bloaters, etc.), fresh	15,341,588	708,038.00
Ciscoes, salted and smoked	2,917,766	139,344.00
Whitefish, fresh	3,145,780	327,991.00
Whitefish, salted	28,048	2,174.00
Perch, fresh	2,361,071	116,419.00
Perch, salted	1,725	81.00
Suckers, fresh	2,103,163	74,803.00
Suckers, salted	14,110	625.00
Wall-eyed pike	132,024	18,445.00
Carp	246,503	7,500.00
Catfish and bullheads	164,466	6,627.00
Pickerel	40,597	3,375.00
Sturgeon, Caviar	346	904.00
Sturgeon	10,805	2,517.00
Crawfish	80,495	4,427.00
Lawyer	166,785	1,436.00
Rock bass	1,714	137.00
Buffalo	1,290	56.00

During 1917 the Great Lakes as a whole yielded $6,416,477 on a total investment of $10,732,879. In Lake Michigan fourteen-fifteenths of the product of the fisheries came from the species which were caught in deep water. In Lake Erie, which is shallower, more than half the value of the fisheries also came from deep water. These lakes are in marked contrast to those in the course of the Mississippi River (Lake Pepin, Lake Keokuk)[2] where practically all the revenue comes from shallow water fishes—carp, buffalo, dogfish, catfishes, sheepshead, etc.

The fishes in Lake Michigan, which are of most value commercially, not only live on or near the bottom in deep water, but secure their food there. The soft bottom ooze, directly or indirectly, supports many detritus-feeding crustaceans (Pontoporeia, Mysis), clams (Sphaeridae), and insect larvae (mostly those of midges and may flies). The ciscoes, which are the most abundant fishes, the little cottids, the long-nosed sucker, and the whitefish feed largely on this bottom fauna. The trout and lawyer are primarily fish eaters. All these fishes are true deep-water species which have not, in the long period since glacial times, migrated to any extent into small inland lakes or into streams. They are at home in the cool depths of large lakes—where there is always low temperature, great pressure, and little or no light.

[2] Annual Report of the United States Commissioner of Fisheries to the Secretary of Commerce, pp. 78, 79.



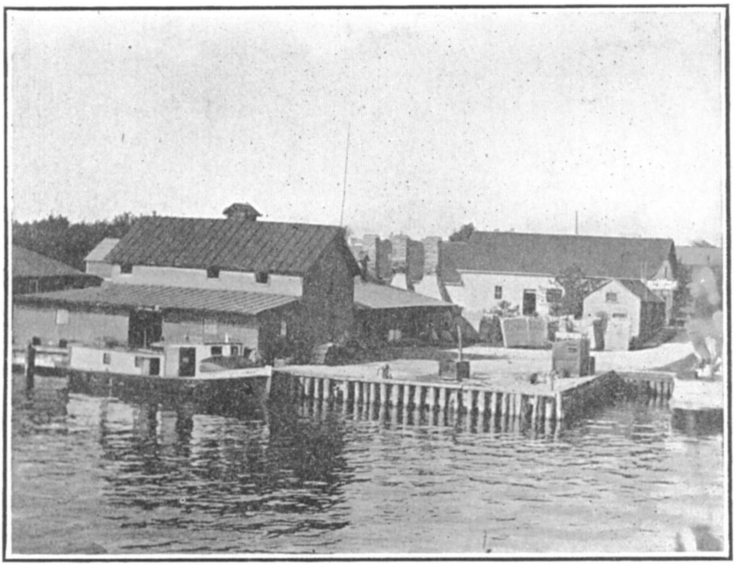
CLEANING FISH ON THE WAY HOME

In the shallow waters of Lake Michigan the yellow perch is the most abundant species. It is rather omnivorous in its food habits, and is at home in a variety of habitats. These characteristics probably account for its abundance, but for some reason it does not go into deep water. The pickerel and pikes, which are common, are fish eaters. The sheepshead prefers snails to other foods. The other shallow water fishes which are of commercial importance are dependent on aquatic vegetation and the small animals which live among plants for food. Where vegetation is plentiful, as on swampy shores and at the mouths of rivers, they are abundant.

The ability of any body of water to produce large numbers of fishes depends primarily on its food resources. Somewhere in the shore vegetation, or in the microscopic life of the open water, or in the soft bottom mud there must be sufficient quantity to permit many fishes to maintain themselves from day to day. In Lake Michigan the great bulk of the fish food is in or near the bottom mud. Lake Erie with its larger area of shallow water has a different ratio of food resources and supports more shore fishes.

Lake Pepin, which is really not a true lake, but an expansion of the Mississippi River, has quite different food resources for fishes. The temperature of this lake is rather uniform at all depths and varies markedly with the seasons. The bottom shifts continually and does not support an abundant fauna. There are none of the deep water fishes of lakes here, but many species peculiar to rivers—spoonbill, redhorses, quillbacks, sand sturgeon, etc. The fishes in Lake Pepin feed more on the microscopic organisms in the water and the foods dependent on aquatic vegetation than those in Lake Michigan. This means that the food resources for the fishes that man makes commercial use of are not in Lake Pepin (or in the Mississippi River) itself but along the shores and in the tributary swamps and lakes. A river is a highway to feeding grounds in lakes, swamps, or other habitats where fish foods are abundant and many fishes pass through it. The open water of a large river contains food for fishes as microscopic plankton organisms which float in the water, but its bottom is rather barren. The plankton is derived largely from swamps, ponds, shores, and is not developed in quantity in open water.

The problems relating to conservation of the food resources of the fishes which have commercial value are not the same in Lake Pepin and Lake Michigan. Because the former resembles a river in being largely dependent on is tributary lakes and swamps for food, it has a more precarious food supply. Rainfall controls the height of its water and the availability of its food resources. If the swamps along the Mississippi are ever filled or drained to further agriculture, the fisheries must suffer. If the access of fishes to tributary lakes is cut off by dams, or if the value of the river as a highway is destroyed by the presence of the wastes of commerce in the water, fishes must decrease in numbers. The continued success of the fisheries of the Mississippi depends largely on the conservation of the habitats tributary to the river itself. The fisheries in Lake Michigan have greater hope of continued stability because the food resources of the commer-

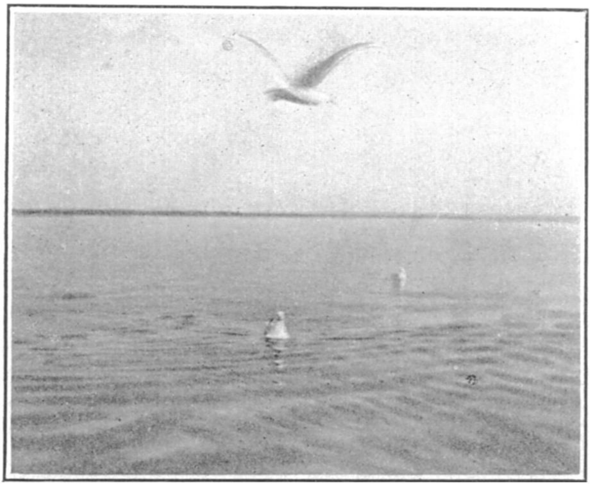


KALMBACH'S FISH MARKET

cial fishes are in deep water, where they are less likely to be depleted or destroyed by civilization.

The quantity of food available limits the number of fishes that can exist in a given volume of natural water, but whether fishes grow to large size is dependent on other factors. Stagnation or continued movement of the water may make it impossible for fishes to take advantage of foods which might otherwise be available. Parasites may be so abundant as to kill fishes or impede their growth. To state the case briefly—the number of fishes that may *exist* depends largely on food resources, but ability of fishes to grow to large size depends on the opportunities they have to live a healthy, normal life and *grow.* In this connection true lake habitats appear to have the advantage over those of rivers in their stability. The bottom and the deep water of Lake Michigan are dependable; they can be counted on to furnish about the same amount of food each year and to offer safe retreats. The food for fishes in Lake Pepin depends on rainfall and varies in different years. The variation in the height of the water also makes conditions for breeding and shelter uncertain.

The inland fisheries of the United States constitute great natural resources which ought to be as carefully and as scientifically conserved as farm lands, forests or water power. Yet in proportion to their value, they have received comparatively little attention. There are stations for hatching eggs, and cars for distributing young fishes for stocking inland waters. There are several well-equipped stations for the investigation of problems relating to marine fisheries. For fresh-water there is only one station where scientific work concerned with fisheries is undertaken—on the Mississippi River at Fairport, Iowa. This paper attempts to point out that the fundamental problems relating to the conservation of lake fishes are different from those in rivers.



THE GULLS FOLLOW THE FISHING BOATS ALL DAY LONG